USAID/Bechtel Iraq Infrastructure Reconstruction Program

Accomplishments — Spring 2006

Bechtel began work on the US Agency for International Development's Iraq Infrastructure Reconstruction Program in April 2003. Since then, the program has seen a number of notable accomplishments, including:

- Dredged Port of Umm Qasr, Iraq's only deepwater port, to enable commercial and humanitarian traffic.
- Restored Port of Umm Qasr grain handling facility, enabling the transfer of up to 60,000 tons of grain per day.
- Completed repairs to enable resumption of commercial flights at Baghdad and Al Basrah International Airports.
- Renovated 1,239 schools.
- Refurbished 10 fire stations and 52 primary health clinics.
- Constructed 57 kilometers (35 miles) of new rail lines.
- Restored switching stations required to reconnect more than 215,000 Baghdad telephone subscribers.
- Restored fiber-optic backbone connecting Iraqi cities to the Baghdad area data and communications network.
- Repaired three bridges (Al Mat, Al Khazir, Tikrit) critical to humanitarian and commercial traffic flow throughout Iraq.
- Total electric projects completed to date have increased capacity by over 1,200 MW through improved reliability or new generation.
- Restored or built Water Treatment Plants capable of providing treated water to over 8.7 million people.
- Restored Waste Water Treatment Plants capable of supporting the sanitation needs of over 7 million people.
- Provided over 400,000 hours of Operations & Maintenance training to support the sustainable operations of facilities in the future.

Treated water pipeline backfill at a community in central Iraq

A wastewater treatment plant in operation in southern Iraq

Installing H-pile for retaining wall of a power plant in central Iraq where Bechtel is building new generation units

USAID/Bechtel Iraq Infrastructure Reconstruction Program (cont.)

Accomplishments — Spring 2006

Project highlights:

- Commissioned the Al Qudas power plant to operate on more readily available heavy fuel oil, making the availability of 216 MW.
- Increased output at Al Mussayib Power Plant by 240 MW.
- Refurbished three units at Bayji power plant in Northern Iraq, increasing output by 180 MW or more than 50 percent.
- Completed construction and commissioning of new Kirkuk v64 and v94 power units capable of producing 325MW.
- Commissioned Kirkuk Water Treatment Plant in Northern Iraq. Supports the drinking water needs of approximately 750,000 people in northern Iraq.
- Restored treated water system for 40,000 residents of Safwan in southern Iraq.
- Dredged and restored Sweet Water Canal reservoirs and 14 water treatment plants, serving 5.1 million people in Al Basrah and surrounding areas of southern Iraq.
- Started up major portions of the Al Rustimiyah South and the Al Rustimiyah North Wastewater Treatment Plants. These two plants treat 123 million gallons/day of wastewater and their operation restores over 60 percent of Baghdad's sewage treatment for the first time in more than a decade.
- Restored emergency communications services prior to national constitutional referendum.

Debris (foreground) brought up from the bottom of the Port of Umm Qasr--clearly a navigational hazard

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Airports

USAID/Bechtel Iraq Infrastructure Reconstruction Program

Reconstructed Terminal C at Baghdad International Airport

The immediate mission of the Airports program was to restore critical infrastructure at Baghdad (BIAP) and Basrah (BSR) International Airports to support opening of the airports for limited, international commercial flights operating under daytime visual meteorological conditions (VMC). Both airports suffered minimal damage from the 2003 conflict, but airport functions had deteriorated from a lack of maintenance and replacement parts for many years. An important component of the program is transitioning from military to civilian navigation aids for flight operations.

Projects

Work at BIAP and BSR included restoration of civil, electrical, mechanical, and communications systems, as well as pavement striping and installation of signage at the airfields to meet international aviation standards. Bechtel has installed very small aperture terminal (VSAT) satellite communications systems to link BIAP and BSR area control centers with national airports, remote radar sites, and very high frequency (VHF) band remote-control air ground stations. Supplemental infrastructure upgrades included refurbishment of the fire station and air traffic control tower; a new electric substation, new power generation, and other administrative facilities at BIAP, as well as restoration of security fences at BSR.

Benefits of the Program

The Airports program has equipped Iraq's civil aviation authority with the necessary physical infrastructure to enable opening of BIAP and BSR to commercial operations. In the third quarter of 2004, BIAP reopened to commercial air traffic, providing Iraqis with an important link to other parts of the Middle East and beyond. With the reopening of the Al Basrah Interna-

The Airports program

Bechtel's Airports program restored critical infrastructure to support commercial flight operations at two airports: Baghdad International Airport (BIAP) and Basrah International Airport (BSR).

Baghdad International Airport control tower

Approach to Basrah International Airport

New pavement markings for civilian runway

Airports (cont)

tional Airport on February 13, 2006, international travelers as well as Iraqi citizens will benefit from an easing of the flow of much-needed goods and services into the country. Furthermore, airport operations, concessions, and other subcontracted functions will provide many new jobs and other benefits to the local economy, helping foster stability and prosperity.

Jobs Created by the Program

The Airports program employed 11 Iraqi subcontractors and 9 international subcontractors. Six Iraqis were employed, including two field engineers, on a direct-hire basis to support program implementation. The program created approximately 800 jobs for managers, engineers, technicians, and unskilled workers across Iraq.

Project/Site Selection

Bechtel completed detailed inspections of BIAP and BSR and reported our findings to the US Agency for International Development (USAID). Work identified was prioritized into emergency, short-term, intermediate-term, and longer-term projects.

Bechtel also consulted with USAID, Army and Air Force units, US Department of Defense civilian functions, US Federal Aviation Administration, US Transportation Security Administration, Iraq Ministry of Transportation and Communications, the Iraqi Civil Aviation Authority, and the operator of BIAP and BSR to refine infrastructure priorities at each airport.

Work Description

BIAP – Bechtel's work at BIAP encompassed all disciplines: civil, architectural, electrical, mechanical, and communications. The company hired subcontractors to refurbish existing structures and facilities; repair or perform maintenance on existing utilities and equipment; and install new facilities where needed. To improve security at BIAP, 5 km of perimeter fencing was repaired.

BSR – Bechtel's work at BSR included maintenance, repairs, and replacement of damaged or missing systems, such as emergency power generation. Wireless communication equipment needed for the proper functioning of airport operations was installed. Airfield markings were repainted and perimeter fences restored. Essential utilities, such as the sewage treatment plant, were returned to service to support the airport for commercial operations.

Airfield painting operations

Inspection of fuel transfer pump skid for new generators

Construction of new security fencing

Fueling operations for airport generators

Bridges

USAID/Bechtel Iraq Infrastructure Reconstruction Program

The Tikrit Bridge reopened in September 2004. The bridge, an important link over the Tigris River between northern and southern Iraq, is one of three in Bechtel's scope.

Bechtel reconstructed three bridges damaged in the 2003 conflict: Al Khazir Bridge, located between the northern cities of Mosul and Arbil; Al Mat Bridge near Ar Rutbah village in western Iraq; and Tikrit Bridge over the Tigris River.

Project Description

The Al Khazir Bridge consists of a pair of dual-lane bridges crossing the Al Khazir River (two lanes in each direction). One end span in each direction was destroyed. Bechtel demolished the damaged spans and rebuilt the abutments. The reconstruction plan included running traffic on a military bridge on one westbound lane while repairs were made to the eastbound lanes. Two-way traffic was diverted to the eastbound lanes once their construction was complete, enabling repair of the westbound lanes. The bridge reopened to full traffic flow at the end of April 2004.

The Al Mat Bridge comprises a pair of dual-lane bridges that suffered extensive damage. Bechtel constructed a bypass in summer 2003 to keep traffic moving between Baghdad and Jordan through the Al Wadi valley. In March 2004, all demolition and reconstruction were completed and the bridge opened to traffic, enabling several thousand vehicles a day to deliver humanitarian aid and supplies to Baghdad from Amman, Jordan.

The Tikrit Bridge is a two-lane bridge with a single lane in each direction. Due to heavy damage, traffic was using military bridges for eastbound traffic and the remaining bridge deck and sidewalk for westbound traffic. The bridge was completed and reopened to traffic in September 2004, restoring a vital link between Northern and Southern Iraq.

Worker drilling handrail on Tikrit Bridge, now reopened to traffic.

The south span of Al Mat Bridge, a key transportation link in Iraq, reopened to traffic in February 2004.

Khazir Bridge in northern Iraq reopened to full traffic flow in April 2004.

Bridges (cont)

Benefits of the Program

Reconstruction of the three key bridges reconnects Iraqis to the main southern, central, and northern surface routes.

The Al Khazir Bridge is on the primary highway between Al Mosul and Arbil, critical to the flow of fuel and agricultural products in the north. The Tikrit Bridge on the route heading north from Baghdad is an important link for humanitarian aid and commerce over the Tigris River between Tikrit and Tuz Khurmatu. The Al Mat Bridge is on Highway 10, the main route for commerce between Iraq and Jordan.

Jobs Created by the Program

Bechtel employed two Iraqi subcontractors for the Bridges program. The company also employed four Iraqi field engineers-two at the Al Khazir Bridge and one at each of the other two sites-to work alongside other Bechtel superintendents. The bridge reconstruction program created more than 400 jobs for Iraqis nationwide; Iraqi fabricators providing materials for the restoration work created additional jobs at their factories.

Bechtel also ensured that several technical laboratories in Baghdad, Arbil, and Al Mosul met international testing standards before they performed the testing of aggregate, steel, and concrete.

Project/Site Selection

In spring 2003, Bechtel inspected more than 40 bridges, most of which had suffered damage from military action. The Al Mat, Al Khazir, and Tikrit bridges were selected for reconstruction based on their importance to Iraqi national interests (emergency services, humanitarian aid, and commerce); the communities they serve; the complexity of reconstruction; and the presence or absence of alternative routes within a reasonable distance.

Work Description

The execution plan at each of the three bridges called for maximizing employment of Iraqis by subcontracting with local companies to perform demolition, repair concrete, and reconstruct downed spans with pre-cast post-tensioned beams and a composite bridge deck. All damaged handrails and lighting were replaced or repaired. The Tikrit Bridge required special attention due to a US Army requirement that one lane of the bridge remain open throughout its construction.

Khazir Bridge north abutment ready for form and rebar.

Completed demolition of a span of Al Mat Bridge.

Tikrit Bridge posed significant reconstruction challenges.

Buildings and Facilities

USAID/Bechtel Iraq Infrastructure Reconstruction Program

Bechtel employee greets students at the Rafah al-Assasiya School for girls in Baghdad, Iraq

The Buildings and Facilities program includes rehabilitating schools, primary health care clinics, and selected fire stations, and constructing a new children's hospital.

Projects

The program called for rehabilitating over 1,200 primary and secondary schools, with more than 1,000 to be completed prior to October 1, 2003, the beginning of the school year. Bechtel worked at more than 1,100 building sites simultaneously and completed the rehabilitation before the school year started. The clinics program included repair of 52 health care clinics around the country and 10 fire stations in Baghdad. The fire stations were completed by the end of November 2003, and the clinics were completed in February 2004.

Work started on the Al Basrah Children's Hospital in mid-2005 with the first concrete pours occurring on August 14. This project consists of a 94-bed pediatric teaching hospital with operating rooms, outpatient clinic, and student housing and is designed to accommodate future growth.

Benefits of the Program

The Buildings and Facilities program covered 14 major cities throughout Iraq, from Dahuk and Mosul in the north to Al Basrah in the south. These cities represented about one half of the total Iraqi population, or 12 million people.

Approximately 1 million children returned to newly refurbished schools. The hiring of Iraqi engineers and subcontractors allowed Bechtel to transfer management expertise and current practices to the Iraqi engineering and construction industry. Bechtel also created a role for Iraqi engineers from the Ministry of Housing and Construction to help supervise construction.

From Georgetown to Baghdad

When a Bechtel engineer graduated from Georgetown University in 2003, he wasn't sure where his MBA might take him. Soon after graduation, the dual Iraqi-American citizen attended Bechtel's contractors' conference in Washington, DC - and began a journey that's taken him back to the the land of his birth. He supervised the repair of 125 primary and secondary schools in some of Baghdad's most neglected neighborhoods.

Bechtel engineer surrounded by Iraqi schoolchildren returning to newly rehabilitated schools

Sign posted by administrators of a Bechtel-refurbished school in Basrah

Buildings and Facilities (cont)

The refurbishment of primary health care clinics has helped lessen overcrowding of Iraq's limited hospitals. Rehabilitation of the 10 Baghdad fire stations in Bechtel's scope vastly improved the city's firefighting capability.

When the new Al Basrah Children's Hospital is complete, it will provide a state-of-the-art training program for Iraq's medical students and doctors. It also will provide urgent care to the country's most critically ill children.

Jobs Created by the Program

The Schools program employed 69 Iraqi subcontractors. In addition, Bechtel employed approximately 65 Iraqi engineers to help with oversight and supervision of construction activities. Overall, the Schools program created over 30,000 jobs for skilled and unskilled workers nationwide and the hospital has over 650 Iraqi staff involved in design, procurement and construction.

Project/Site Selection

The Ministry of Education selected the schools with input from the US Agency for International Development (USAID), Coalition Provisional Authority (CPA) representatives, various military units, Ministry officials, and local community leaders. Typically, facilities selected for rehabilitation were dilapidated schools in the poorest districts.

Work Description

Schools. This program consisted of repairing floors, ceilings, walls, windows, and doors; installing new lighting and fans; repairing faulty electrical systems; installing new water supply systems; and refurbishing lavatories. Bechtel coordinated construction activities with USAID so that the schools could be quickly equipped with supplies following completion of our work.

The schools work was inspected and accepted by the US Army Corps of Engineers on behalf of USAID. Bechtel then immediately began reinspection of schools under the company's one-year warranty program. Bechtel looked into concerns and ensured that any necessary repairs were made. As Bechtel subcontractors' work carries the one-year warranty, there was no additional cost to US taxpayers.

Clinics and Fire Stations. For clinic refurbishment, in consultation with Ministry officials and USAID health advisors, Bechtel implemented clinic standards developed by the Ministry of Health. Bechtel work included repair and replacement of doors, windows, and other fixtures; restoration of plumbing, electrical, and mechanical systems; installation of air conditioners and smoke detectors; general cleaning; and outer-building repairs.

Al Basrah Children's Hospital. A 94-bed, state-of-the-art teaching hospital is being constructed to both provide care to critically ill children and to train Iraq's next generation of pediatricians. The Ministry of Health has approved the hospital's design which provides for future expansion to up to a 200-bed facility. The majority of work is being performed by Iraqi subcontractors maximizing the use of local Iraqi labor. Bechtel and Iraqi personnel are providing construction oversight.

Typical before and after views of a rehabilitated classroom

The Buildings and Facilities program refurbished:

- Over 600 schools in Baghdad
- Over 170 schools in the north
- Over 200 schools in the "heartland"
- Over 250 schools in the south
- 52 clinics throughout Iraq and 10 fire stations in Baghdad

"I've managed the construction of some of the world's largest commercial buildings, but the job of repairing Iraqi schools – where the future leaders of the country will be educated – has given me the greatest personal and professional satisfaction of my career."

Project Manager
Buildings and Facilities Program

Ports

USAID/Bechtel Iraq Infrastructure Reconstruction Program

Dredger *Carolina* at work at the Port of Umm Qasr

Upon entering Iraq in April 2003, Bechtel found the Port of Umm Qasr-consisting of the Old Port, New Port, and a large grain handling facility-in a rundown condition with limited commercial power and no water supply. Bechtel's mission was to perform rehabilitation work and open Umm Qasr to receive humanitarian aid shipments. Major activities included dredging the silted-up New Port so it could accommodate larger ships, as well as to return the grain facility to operation.

The grain facility was looted after the 2003 conflict and it was necessary to carry out a reconstruction and restart program. The program was executed using direct-hire superintendents with Bechtel procurement personnel purchasing materials and equipment. Bechtel subcontracted a local Iraqi company to provide labor and equipment as needed.

Projects and Schedule

The main projects at Umm Qasr included dredging to 12.5 meters; performing wreck removal to facilitate dredging and make the main channel navigable again; cleaning, repairing, and starting up the grain facility; provisioning and installing temporary diesel generators; upgrading wet and dry utilities; and performing building and security upgrades to support port operations. All work was complete in November 2003 and the port opened for business.

Benefits of the Program

The capacity of the New Port has been increased from 4-meter-draft to a 12.5-meter-draft ship accommodation and the grain facility can now unload and store up to 60,000 tons of grain. The New Port is open to ferry service from Dubai that brings in passengers, vehicles, and freight.

Key Port of Umm of Qasr projects include:

- Dredging to enable entry of large ships
- Performing wreck removal and underwater ordnance disposal
- Cleaning, repairing, and starting up the grain facility
- Performing infrastructure and security upgrades to support operations

Humanitarian aid flows again after the opening of the Port of Umm Qasr

Submerged ship being lifted from Port waters

Ports (cont)

Jobs Created by the Program

Bechtel employed three Iraqi and two international subcontractors for the port and grain facility rehabilitation. The project also employed eight Iraqi professionals to assist in the construction work and to set up and operate a local warehouse. The port and grain facility program has generated employment for over 500 skilled and unskilled workers.

Project/Site Selection

The critical components of the program were selected after consultation with the US Agency for International Development (USAID), USAID's port operations contractor, and the World Food Program. The shared objective made it possible for large vessels to access the port for delivery of humanitarian aid and other needed materials for reconstruction.

Work Description

The first critical activity was to open up the blocked New Port by dredging. Within two weeks of the initial USAID contract award, Bechtel had mobilized a survey vessel and begun carrying out a detailed bathymetric survey to determine water depth within the Old and New Port waters. A large US cutter-suction dredger mobilized from Bahrain and began dredging the blocked mouth into the New Port on May 8, 2003. When completed, dredging increased the draft in the entrance channel to a low-tide water depth of 12.5 meters.

The New Port opened to commercial traffic in June 2003. On June 25, 2003, the first two large ships carrying food shipments berthed and began unloading their cargo. Today, over 50 ships per month enter and offload cargo.

To ensure success of the dredging operation, Bechtel conducted a detailed magnetometer survey to detect underwater obstacles that might be unexploded munitions or otherwise interfere with port operations. Following the survey, a US specialist company was awarded a salvage contract to remove numerous underwater obstacles. One major wreck, three smaller vessels, and miscellaneous debris such as sunken pipe, metal sheeting, and cable were removed.

Repairing the bulk distribution system at the grain facility

Completion of Al Muhallab wreck removal

"The word 'dredging' hardly captures the challenge of removing a decade's accumulation: from silt and ordinary debris, to sunken vessels, to unexploded ordnance."

Project Manager
Port of Umm Qasr

Power

USAID/Bechtel Iraq Infrastructure Reconstruction Program

216 MW power plant in central Iraq

In April 2003, Bechtel entered Iraq and found the country's electric system in extreme distress, capable of delivering electricity to only a fraction of its 24 million inhabitants. Bechtel's first task was to assess the full extent of damage after three wars, sanctions, looting, and general neglect.

Following this assessment, Bechtel focused on rehabilitating key elements of Iraq's existing generation system; rehabilitating transmission and distribution systems; and constructing new generation to help meet demand for electricity. These efforts were supplemented by institutional strengthening and other sustainability efforts to support the continued long-term service life of the plants after the physical work is complete.

Projects and Schedule

Bechtel's work on behalf of the US Agency for International Development (USAID) involves facility rehabilitation and construction of new power plants.

Since entering Iraq, Bechtel has:

- Commissioned two units at the Al Qudas Power Plant northeast of Baghdad to run on more plentiful heavy fuel oil, increasing the availability of the units' 216-MW output. Additionally, a hot gas path inspection and refurbishment restored 120 MW of output.
- Rehabilitated three units at the Bayji Power Plant in northern Iraq, increasing output by 180 MW.
- Constructed and commissioned the v64 and v94 units at the Kirkuk Power Plant in northern Iraq capable of delivering 325 MW.
- Increased output of the Mussayib Power Plant in central Iraq by 240 MW and improved the reliability for an additional 215 MW.
- Increased output at the Najibiyah, Hartha, Khor Al Zubair and Shuaibah Power Plants by 60 MW and improved the reliability of another 20 MW through rehabilitation of key plant equipment.

Repaired Transmission Tower in southern Iraq

Turbine of a key power plant in Bechtel's scope.

Power (cont)

- Constructed 25 substations (32kV to 11kV) in the Baghdad area as well as substations for the Baghdad International Airport and the Port of Umm Qasr.
- Constructed and commissioned Baghdad South power plant providing 215 MW of new power capacity.
- Rehabilitated Daura Unit 5, increasing capacity by 120 MW.

Other activities in Bechtel's scope of work in the power sector include:

Generation and Outage Support - Bechtel's work includes providing expertise at individual power plants to help optimize generation output and minimize downtime. The company provides technical support to Ministry of Electricity (ME) operations personnel who maintain and operate facilities.

Sustainability and Institutional Strengthening - Since the late 1980s, Iraq's power sector has lacked an effective operations and preventive maintenance program and culture to ensure the sustainability of the country's electric generation system. Bechtel assists in procurement of needed replacement parts and consumables (over US$40M to date). Bechtel has provided over 90,000 hours of training to ME employees responsible for operating and maintaining the plants now and into the future.

Transmission Restoration - In June 2004, Bechtel completed rehabilitation of 160 km on the Khor Az Zubair to Nasiriyah 400 kV transmission line. As a result, for the first time in many years, residents in southern Iraq are connected with the rest of the country's electric grid, increasing the reliability and availability of their electricity supply.

Benefits of the Program

The program will benefit all Iraqi citizens, delivering stable electrical power to Iraqi consumers. This improvement will foster economic growth, allow water treatment and supply and enhance service in virtually every sector of the economy.

Jobs Created by the Program

Bechtel's Iraqi engineers with experience in the power industry monitor work carried out by Iraqi and international subcontractors. Additionally, 5200 jobs were created for skilled and unskilled Iraqi workers over the course of the effort.

Project/Site Selection

Early in the program, Bechtel completed a countrywide assessment of Iraq's power infrastructure. The project used a systems approach to evaluate its assessment results and categorized reconstruction needs into several broad categories: emergency electricity supply, power plant and transmission rehabilitation, water treatment plant restoration, and new generation and transmission. Bechtel has continued to work in collaboration with USAID and the ME to evaluate and accommodate additional work that has emerged since completion of the assessment period.

Work Description

The program encompasses a broad range of activities, including turbine refurbishment, construction of new generating units and control system and switchyard component replacement.

Major components of the Power program include:

- Generation support
- Outage support
- General program support
- Project execution, including thermal and gas-fired plants as well as water treatment systems at most Ministry of Electricity plants

"The resourcefulness of Iraqi engineers is remarkable. Their ability to keep these power plants running at all – with no investment, no spare parts, and no dependable supply of fuel – is a tribute to their ingenuity."

Project Manager
Power Program

Rail

USAID/Bechtel Iraq Infrastructure Reconstruction Program

Unloading and spacing ties in a rail yard. Iraqi Republic Railways (IRR) has performed and supervised track laying, as part of the joint Bechtel-IRR Rail program.

Bechtel and Iraqi Republic Railways (IRR) jointly constructed a new European-Standard rail line in the Al Basrah region to improve freight transport service from the Port of Umm Qasr to the rest of the country. The existing single-track line had not been upgraded since it was constructed during the 1960s and its poor condition caused derailments, accidents, and delays to rail service. By working jointly with IRR, Bechtel leveraged in-country resources to expedite the work as well as trained IRR personnel in current industry practices. The work was completed in December 2004.

Project Description

The rail program constructed 56 km of new European-Standard track. Bechtel repaired 50 ballast wagons, repaired IRR-owned track equipment to support the track construction, refurbished and upgraded IRR equipment-repair facilities in the Baghdad area, loaded and transported track materials, and crushed 140,000 cubic meters of railroad ballast. Between Al Basrah and Umm Qasr in Southern Iraq, Bechtel reconstructed 5 station buildings and 11 grade crossing gatehouses. The company also completed construction of 56 km of rail bed and 29 concrete culverts. Bechtel provided IRR staff with training in track construction, maintenance, and inspection methods.

Benefits of the Program

Ocean freight destined for Iraq is received at the country's sole deepwater seaport at Umm Qasr. The only land access from the Port to the rest of the country is via one congested four-lane highway and a single-track rail line. The program enhanced the existing rail network along with other rail improvement initiatives. The new rail line can accommodate up to 30 trains

IRR train in operation

IRR workers laying rail

Placing concrete for the roof and walls of a double-box rail culvert on the new rail line

Rail (cont)

per day, a five-fold increase from the historic service level of four to six trains per day. The new line has the capacity to triple rail speeds from 30 to 90 km/hour.

Finally, the Rail program will provide improved rail safety and reliability in the Al Basrah region by reducing derailments and other accidents that severely hamper rail service.

Jobs Created by the Program

Bechtel contracted with four Iraqi construction companies who provided approximately 400 jobs for Iraqi workers. Bechtel also employed 10 Iraqi civil and railway engineers to assist in management and supervision of the work.

Project/Site Selection

In spring 2003, Bechtel and IRR personnel inspected more than 1,100 km of track and associated facilities along the network. Bechtel supplemented field inspections by meeting with its client, the US Agency for International Development (USAID), as well as US and British military and IRR representatives to evaluate existing rail operations. USAID prioritized the most urgent needs for infrastructure improvement.

Construction of new track serving the vital Port of Umm Qasr was chosen for immediate implementation because it would significantly expedite the movement of food and other humanitarian aid.

Work Description

A Bechtel subcontractor performed extensive ordnance clearance before construction work began. Bechtel and IRR used the preexisting IRR design for construction of 64 km of new track plus selected sidings. The team also built 8 km of track within the port. Ballast supply and roadbed work was subcontracted to Iraqi companies. IRR is completing the laying of track using specialized equipment it already owns, and Bechtel has repaired some of this equipment and upgraded IRR equipment-repair facilities. Bechtel also loaded 90 trainloads of permanent materials (such as rail and sleepers) stored at multiple locations along the mainline from Al Basrah to Rabiya at the Syrian border.

IRR project staff worked side by side with the Bechtel team to share current infrastructure planning and implementation practices. Additionally, IRR employees were trained in track construction, including hands-on equipment operations training.

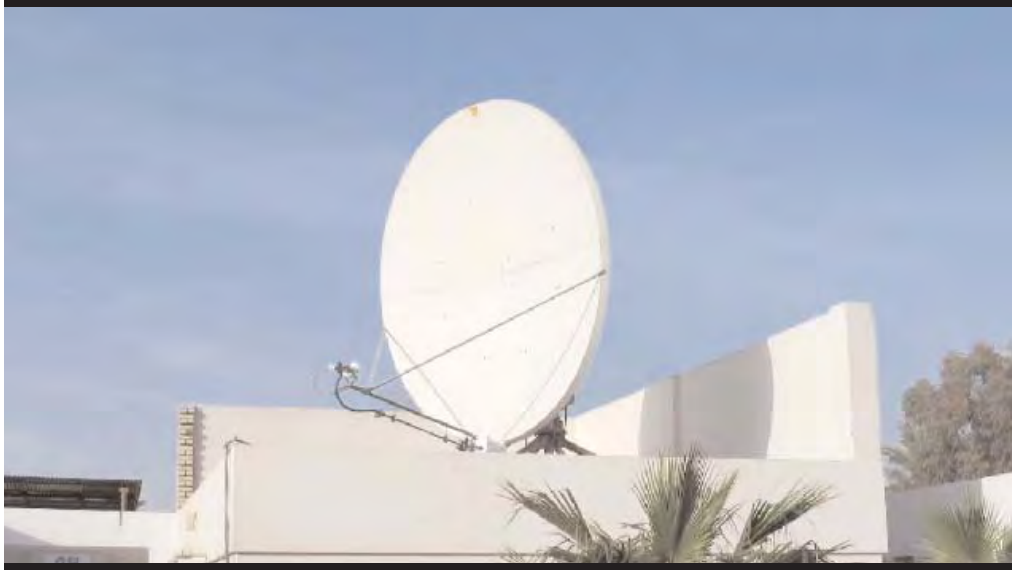
Track alignment under way

Zubayr rail station before refurbishment

Zubayr rail station after refurbishment

Telecommunications

USAID/Bechtel Iraq Infrastructure Reconstruction Program



Satellite dish for a new international gateway that handles all of Iraq's incoming and outgoing international calls.

The larger telephone exchanges within Baghdad, as well as the critical national fiber optic backbone connecting Iraqi cities to the Baghdad area network, were damaged in the 2003 conflict. Bechtel's role in the reconstruction program has been to restore connectivity to telephone subscribers in the Baghdad area and to restore the fiber backbone to pre-conflict capability.

Project Description

The Telecommunications effort began in 2003 with the restoration of telephone subscriber services and international communications through a satellite gateway. These projects called for installation of temporary switches and transmission equipment at each of 12 destroyed exchanges in the greater Baghdad area to enable reconnection of over 200,000 telephone subscribers who lost service; installation of an international satellite gateway in Baghdad to support all of Iraq's incoming and outgoing international calls; and an audit to determine and then perform restoration work along the main 2,000-kilometer, north-south fiber optic backbone connecting the far north to the extreme south.

A well-coordinated effort between international subcontractors, the Iraqi Telephone and Post Company (ITPC), and Bechtel led to the restoration of the telephone exchanges in spring 2004 and the restoration of the satellite gateway in fall 2004. In 2005, the new Consolidated Fiber Network (CFN) project was established to provide high speed, fiber optic communications capability for the ITPC and the Ministry of Electricity.

Benefits of the Program

The program enabled ITPC to reconnect over 200,000 telephone subscribers in Baghdad. Restoration of the satellite gateway enables Iraqis to place inter-

The program includes:

- Installation of containerized switches at 12 sites, allowing reconnection of over 250,000 subscribers
- Installation of a satellite gateway enabling international calls
- Restoration of the country's main north-south fiber optic backbone

ITPC technicians splicing communications cable to help restore telephone service in Baghdad.

Inside Baghdad's main telephone exchange.

Telecommunications (cont)

national calls from anywhere in the country. Connectivity between all major cities north and south of Baghdad - nearly 80 percent of the Iraqi population - delivers voice and data communications to meet the country's immediate requirements as well as to foster future economic development.

Jobs Created by the Program

The Telecommunications program has employed more than 800 Iraqis. These included 450 ITPC employees, several local telecommunications engineers, as well as subcontractor employees. Bechtel also hired three international technology subcontractors.

Project/Site Selection

Work for the Telecommunications program was identified from assessment information developed by ITPC, the Coalition Provisional Authority (CPA), and the Ministry of Telecommunications. The US Army Corps of Engineers inspects and accepts the work on behalf of USAID.

Work Description

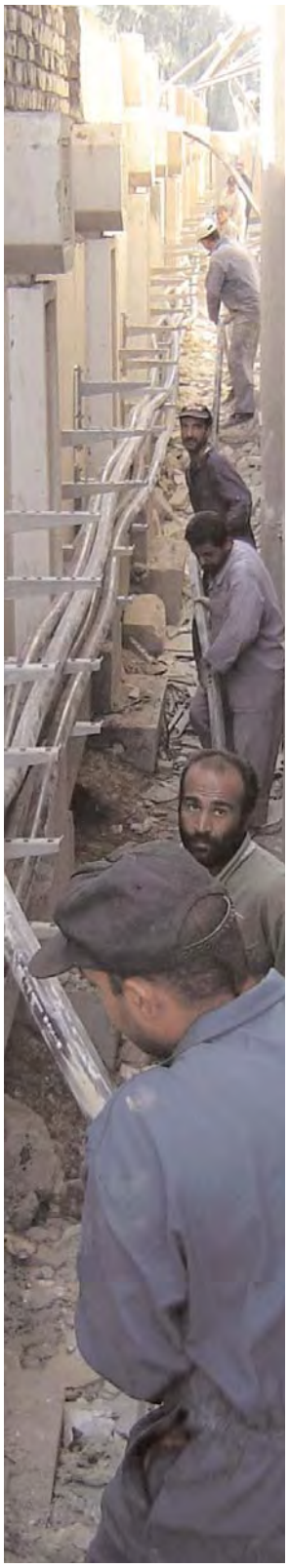
Restoration of Baghdad subscriber services included the purchase and installation of containerized switches at sites adjacent to 12 destroyed telephone exchange buildings. Considerable site preparation was required, such as rubble clearance and site leveling; digging new cable ducts; splicing 1,800-pair and smaller cables; placing concrete slabs for equipment containers; and building security walls, fencing, and lighting installations.

Bechtel technology subcontractor, Lucent, manufactured and installed the switches and related transmission equipment. ITPC personnel performed tip cable connection to the main distribution frame, and Lucent, ITPC, and Bechtel conducted testing and commissioning.

The satellite gateway system was fabricated and assembled by Bechtel technology subcontractor Globecomm Systems, Inc. The 3.8-meter-diameter dish antenna was mounted on the roof of a small pump house, with support equipment placed in containers on concrete pads on the ground. A team of Globecomm and ITPC personnel assembled the antenna and set and installed the satellite gateway system. A joint team of Globecomm, ITPC, and Bechtel engineers performed testing and commissioning.

Nortel Networks, Bechtel's technology subcontractor for restoration of the fiber optic backbone, replaced faulty transmission equipment with new, higher-capacity equipment and software. This work resulted in a complete upgrade of the critical 655-kilometer backbone, which connects all major southern Iraqi cities between Baghdad and Umm Qasr.

The CFN project created connectivity from 60 Ministry of Electricity sites to support voice, data and Supervisory Control And Data Acquisition (SCADA) systems support. This effort also creates a significant revenue stream for the Ministry of Communications.



ITPC employees pulling cable to new telephone switch in Baghdad.

Water and Wastewater

USAID/Bechtel Iraq Infrastructure Reconstruction Program

A wastewater treatment plant in operation in southern Iraq

Bechtel's Water and Wastewater program is restoring water and sanitation systems in Iraq to ensure a reliable supply of treated water to the general public. Iraq's water and sanitation systems, designed to protect public health, were in a state of general disrepair following years of war, sanctions, and inadequate maintenance. Rehabilitation of facilities covers a variety of water and sanitation systems. Bechtel's work on behalf of the US Agency for International Development (USAID) has enabled treatment of wastewater for more than 7.5 million people and restored the ability to provide treated water to meet the needs of over 8.5 million people. Additionally, a comprehensive institutional strengthening and sustainability program provides the basis for continued service beyond the physical completion of the work.

Projects

The program has restored the operating capability of wastewater and water treatment plants in many of Iraq's most densely populated areas. The scope of the program ranges from short-term projects such as the restoration of treated water for 40,000 residents in a southern Iraqi community, to longer-term projects such as rehabilitation of Iraq's two largest sewage treatment plants, which serve more than 4.7 million in the greater Baghdad area.

In the southern city of Basrah, a systematic refurbishment of the water supply system was completed at the end of 2004. The project included cleaning, dredging, and repair of a major source of raw water supply for the region, as well as refurbishment of network pump stations and treatment plants serving 14 communities in the Basrah area. Some 1.7 million residents of Basrah and surrounding areas are benefiting from these efforts.

USAID's water and wastewater improvement program expanded in 2004 when Bechtel and its teamed subcontractor, Parsons of Pasadena, California, began

Bechtel's Water and Wastewater program encompasses projects of varying size and duration across seven cities in Iraq

Some examples:

- A new pumping station and water storage reservoir has restored supply of potable water to 40,000 residents
- New facilities at a water treatment plant will increase potable water supply in Baghdad by 225 million liters a day
- A region of Baghdad is now benefiting for the first time from piped delivery of potable water.
- Refurbishment of a citywide sewage system in Baghdad will benefit 3.5 million residents
- Completed work at Sweet Water Canal has tripled delivery, supplying water to 2 million residents of the Basrah area
- A new Basrah sewer collection system is now serving the city's residents

Water and Wastewater (cont)

work on a variety of programs to build on the successes achieved to date.

The work includes a critical potable water project, which encompasses rebuilding water mains and installing house connections to some of Baghdad's most densely populated neighborhoods; expansion, and repair of several major Baghdad sewer systems; refurbishment of neighborhood sewage distribution lines to ensure that wastewater can be properly disposed of at newly operating sewage treatment plants; and a project that is supplying clean water to more than 50 rural areas throughout Iraq with populations of 5,000 to 10,000 people. When complete, these projects will build on other recent improvements made to Iraq's water and sanitation system and increase the number of people receiving sanitation service and treated water.

The Water Sector Institutional Strengthening (WSIS) program began in late 2005. This program provides assistance with training, start-up, commissioning, operations and maintenance (O&M), inventory control, operating supplies, equipment and mentoring to the Ministry of Municipalities and Public Works (MMPW) and the Ammanat (the organization responsible for Baghdad's sewage systems).

Benefits of the Program

The program will refurbish and increase capacity of water and sewage treatment facilities in cities across Iraq. Upon completion, two comprehensive distribution systems will be restored to full capacity and approximately 85 percent of Iraq's total sewage treatment capacity will be able to function fully.

Jobs Created by the Program

Bechtel is employing approximately 40 Iraqi subcontractors in the Water and Wastewater program, and has hired more than 150 Iraqi engineering specialists. Additionally, the program has created jobs for thousands of workers nationwide for periods ranging from six to 12 months. Bechtel also has provided over 170,000 hours of operations and maintenance training to local plant operators who will run the rehabilitated facilities.

Project/Site Selection

Early in the program, Bechtel consulted with USAID, local water authorities, and non-governmental organizations active in the water sector. Ultimately, USAID selected priority projects based on positive public health impacts and quality-of-life improvements for local residents.

Work Description

Execution of the work begins with a needs assessment, followed by detailed engineering and construction at the site. When physical construction is complete, plant commissioning starts and plant operators are trained in modern facility operations and maintenance practices.

Enjoying a drink from a potable water filling station in northern Iraq.

Treated water pipeline backfill in a central Iraq community

Clarifier in operation at a waste water treatment plant in Bechtel's scope.